

## SHORTER NOTES

***Asplenium abscissum* Willd. (Cutleaf Spleenwort) in Alabama.**—*Asplenium abscissum* Willd. (Cutleaf Spleenwort) is a tufted fern with unbranched, brown-scaled stems, leaves that are deltoid in outline with lanceolate pinnae and a fibrous root system (Nelson, *The Ferns of Florida: A Reference and Field Guide*. Pineapple Press, Inc. Sarasota, FL. 2000). Nelson also reports that spores mature year-round from sori that arise in pairs along the edge of lateral veins. This lithophilic fern is almost always associated with some form of limestone, as in eroded rockland hammocks, cliff ledges, cave entrances, or watery grottoes (FNA, *Flora of North America*. Editorial Committee, eds. 1993+. *Flora of North America North of Mexico*. New York and Oxford. Vol. 2, pg. 236. 1993). *Asplenium abscissum* is considered a New World tropical species that is distributed from Brazil south to Bolivia, throughout Central America and Mexico, the West Indies of the Antilles, and thinly spread across seven southern/central Florida counties in the continental U.S. (FNA, 1993; Kartesz, *Floristic Synthesis of North America*. BONAP. *In Press*. 2010).

This paper reports the recent discovery and documentation of a new Cutleaf Spleenwort population for Jackson County, Alabama, 6.5 km (4 mi) south of the Tennessee border at an elevation of 925 ft (282 m) above sea level (Fig. 1). The next closest known population occurs approximately 800 km (500 mi) to the southeast in Alachua County, Florida (near Gainesville). While historically much of lower Alabama was covered with a shallow sea and the climate was more tropical in nature (Lacefield, *Lost Worlds in Alabama Rocks: A Guide to the State's Ancient Life and Landscapes*. Alabama Geological Society. Tuscaloosa, AL. 2000), today Jackson County, Alabama lies at the extreme northern fringe of what is considered subtropical climate.

At the Alabama site, approximately 100 fronds from 50 sporophytes in many stages of development were counted (Fig. 2). Numerous gametophytes were also observed growing along the same 2 m<sup>2</sup> stretch of the east/southeast facing vertical flowstone wall of the cave entrance. *Adiantum capillus-veneris* L. (Venus' Hair Fern) and many bryophytes were also present. The Cutleaf Spleenwort was found growing 6 m below the surface entrance to the vertical cave, with light levels becoming greatly diminished below the fern habitat (approximately 8 m from the surface). Environmental conditions of the cave are modified by a restricted entrance, the "chimney effect" which keeps the ambient temperature from falling below 14°C (56°F) near the plants at any point during the year, and a perennial cave stream approximately 18 m below the fern habitat providing an ambient humidity that is elevated. However, condensation forming on the cave wall and rainfall appear to be the only water sources for the ferns since the flowing water is well below the plants.

Jackson County, the most northeastern county in Alabama, contains the highest number of caves in the state, with this network of caves hosting among the highest number of troglodytic (cave-dwelling) and the highest number of



FIG. 1. Highlighted locations of the eight known county records for *Asplenium abscissum* in the continental U.S.



FIG. 2. Image of the vertical cave habitat and growth habit of *Asplenium abscissum* in Jackson County, AL. The mature fronds pictured are approximately 15–20 cm in length.

troglobitic (cave dwelling animals adapted to complete darkness) species in the U.S. (Kidd, Encyclopedia of Alabama [online edition]. <http://www.encyclopediaofalabama.org/face/Article.jsp?id=h-20202009>. 2009). Although often less celebrated than animal species, many plant species have also become specialists of cave habitats. These populations are often times disjunct from core populations. The processes creating such isolated populations were described by Small in his 1938 book, *Ferns of the Southeastern States*:

“Many of the sinks are evidently the result of the roofs of these caverns falling in. The sinks have become ferneries, but their species are largely the same. Where a small portion of a roof has fallen in leaving a well-like opening, unusual ferns are to be expected where anchorages are available on the walls...”

Also noted by Small (*Ferns of the Southeastern States*. The Sciences Press Printing Company. Lancaster, PA. 1938), floral components are often dramatically different when associated with unusual geological features. Cave entrances can provide habitats approaching more tropical conditions with respect to humidity and temperature. The physical conditions provided by such unusual features may be ideal for species that are considered specialists of a particular niche. Habitat comparisons for the Alabama and Florida populations of Cutleaf Spleenwort illustrate this fact. The Florida populations are typically found growing on limestone substrates surrounded by mixed tropical hardwoods, frequently interspersed with *Quercus virginiana* Mill. (Live Oak) (Nelson, 2000). The Alabama population is surrounded by an ecotone with many *Quercus* and *Carya* species in a dry oak/hickory forest with limestone outcroppings.

Although not listed by the U.S. Fish and Wildlife Service, NatureServe (NatureServe, NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, VA. Available online at <http://www.natureserve.org/explorer>. Accessed September 1, 2009) has designated the Cutleaf Spleenwort as a G3 species indicating that it is globally vulnerable to extirpation or extinction. In Florida, *A. abscissum* has an S2 ranking (NatureServe, 2009). With the sole known Alabama population occurring in such a fragile habitat, the fern should obtain an immediate S1 ranking in Alabama. Small (1938) mentions that *A. abscissum* has been an inhabitant of Florida “for a very long time” and describes discrete events that likely led to the separated populations in Florida (Fig. 1). One event that he described alludes to the tiny fern spores being dispersed for great distances by the wind. In fact, many of the tropical ferns that grow in Florida are now believed to have arrived there from tropical America or the West Indies via hurricanes and other storms (Spurr, Amer. Fern J. 31: 91–97. 1941). Over the course of millennia, spores could have arrived in Jackson County, Alabama by the same means. While it is impossible to say exactly what events led to the establishment of *A. abscissum* in this Jackson County vertical cave, one can speculate that it is simply a relict population from a time when the climate in this part of Alabama was more tropical in nature.

**Voucher:** USA. Alabama. Jackson County: Near Stevenson. Three miles south of Russell Cave National Monument and 2.5 mi northwest of U.S. Highway 72. Approximately 100 mature fronds and 50 individuals were growing on a wet flowstone wall of a vertical cave approximately 6 m below the entrance. The overall depth of the cave reaches nearly 60 m with the surface entrance located 925 ft (282 m) above sea level. GPS coordinates withheld. July 10, 2009. *Barger* #SP107 (AUA, JSU, TROY).

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**Review of Two Non-Native, Invasive Climbing Ferns (*Lygodium japonicum* and *L. microphyllum*), Sympatric Records and Additional Distribution Records from Florida.**—Two non-native species of climbing fern, *Lygodium japonicum* (Thunb.) Swartz and *L. microphyllum* (Cav.) R. Br. are currently present in Florida and are highly invasive in many natural areas of Florida (Gordon, *Ecol. Appl.* 8:975–989. 1998; Langeland *et al.*, *Identification and Biology of Nonnative Plants in Florida's Natural Areas* (2<sup>nd</sup> edition). IFAS Communication Services, University of Florida, Gainesville, FL. 2008). Both of these non-native ferns have become problematic to land managers in natural areas of Florida (Hutchinson *et al.*, *Old World Climbing Fern (*Lygodium microphyllum*) Management Plan for Florida*. South Florida Water Management District, West Palm Beach, FL. <http://www.fleppc.org>. 2006; FLEPPC, Florida Exotic Plant Pest Council's 2007 Invasive Plant Species List. Available on at: <http://www.fleppc.org/list/07list.htm>. 2007). Both ferns exhibit indeterminate growth growing horizontally and vertically, often forming complete cover over native vegetation. From 2005–2006, the total costs associated with control of upland invasive plants on Florida public lands (cities, counties, state and federal) was 9.4 million dollars (FLDEP, Florida Department of Environmental Protection, Bureau of Upland Plant Management (<http://www.dep.state.fl.us/lands/invaspec/2ndlevppls/Uplandsplntman.htm>). 2009). The Florida Fish and Wildlife Conservation Commission's Bureau of Invasive Plant Management currently ranks *Lygodium microphyllum* (Cav.) R. Br. along with hydrilla [*Hydrilla verticillata* (L.f.) Royal] as its priorities for research funding on control methods (Schmitz, *Nat. Areas J.* 27:251–253. 2007). In 2008,